查询SC1151供应商

March 11, 1998

TEL:805-498-2111 FAX:805-498-3804 WEB:http://www.semtech.com

DESCRIPTION

The SC1151 voltage mode controller contains most of the circuitry necessary to implement a DC/DC converter for powering advanced microprocessors such as Klamath, both in single and multiple processor configurations.

The SC1151 features an integrated 5 bit D/A converter, pulse by pulse current limiting, integrated power good signaling, logic compatible shutdown and on-board over voltage protection (OVP).

The SC1151 operates at a fixed frequency of 200kHz, providing an optimum compromise between size, efficiency and cost in the intended application areas.

The integrated D/A converter provides programmability of output voltage from 2.0V to 3.5V in 100mV increments and 1.80V to 2.05V in 50mV increments with no external components.

The SC1151 provides an OVP output which can be used to trigger a crowbar circuit for true over voltage protection.

FEATURES

- 85% efficiency
- 5 bit DAC for output programmability
- On chip power good and OVP functions
- Designed for Intel Klamath VRM8.1 requirements

APPLICATIONS

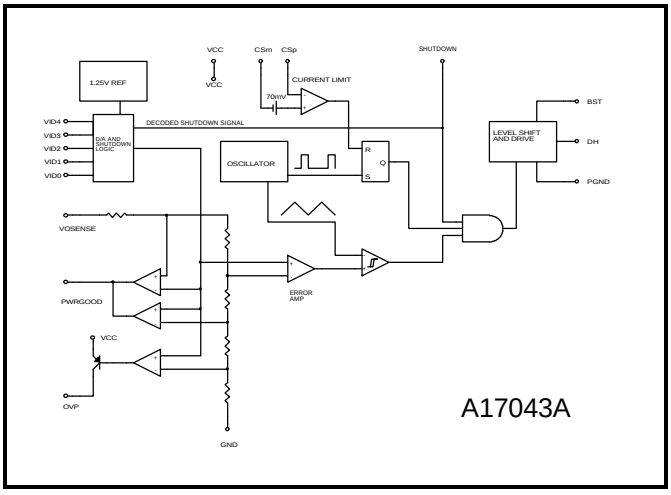
- Klamath microprocessor supplies
- Klamath VRM modules
- 1.8V to 3.5V microprocessor supplies
- Programmable power supplies

ORDERING INFORMATION

DEVICE(1)	PACKAGE	TEMP RANGE (T_J)
SC1151CS	SO-16	0° to 125°C

Note:
(1) Add suffix 'TR' for tape and reel.

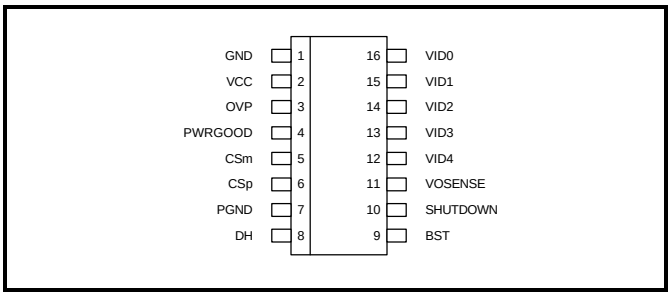
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Maximum	Units
V_{CC} to GND	V_{IN}	-0.3 to 7	V
PGND to GND		± 1	V
BST to GND		-0.3 to 15	V
Operating Temperature Range	T_A	0 to 70	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
Lead Temperature (Soldering) 10 sec	T_{LEAD}	300	°C

PIN CONFIGURATION



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ELECTRICAL CHARACTERISTICS

Unless specified: V_{CC} = 4.75V to 5.25V; GND = PGND = 0V; V_{OSENSE} = V_O; 0mV < (CSp-CSm) < 60mV; T_A = 25°C

PARAMETER	CONDITIONS	VID 43210	MIN	TYP	MAX	UNITS
Output Voltage(2)	I_O = 2A in Application circuit 16935F	00101	1.782	1.800	1.818	V
		00100	1.832	1.850	1.868	
		00011	1.881	1.900	1.919	
		00010	1.931	1.950	1.969	
		00001	1.980	2.000	2.020	
		00000	2.030	2.050	2.070	
		11111	1.980	2.000	2.020	
		11110	2.079	2.100	2.121	
		11101	2.178	2.200	2.222	
		11100	2.277	2.300	2.323	
		11011	2.376	2.400	2.424	
		11010	2.475	2.500	2.525	
		11001	2.574	2.600	2.626	
		11000	2.673	2.700	2.727	
		10111	2.772	2.800	2.828	
		10110	2.871	2.900	2.929	
		10101	2.970	3.000	3.030	
		10100	3.069	3.100	3.131	
		10011	3.168	3.200	3.232	
		10010	3.267	3.300	3.333	
		10001	3.366	3.400	3.434	
		10000	3.465	3.500	3.535	
Load Regulation	I_O = 0.3A to 13A(1)	xxxxx		1		%
Line Regulation		xxxxx		0.5		%
UV Lockout		xxxxx			4.2	V
Current Limit Voltage		xxxxx	60	70	80	mV
Oscillator Frequency		xxxxx	180	200	220	kHz
Oscillator Max Duty Cycle		xxxxx	90	95		%
DH Sink/Source Current	BST - DH = 4.5V, DH - PGND = 2V	xxxxx	1			A
Output Voltage Tempco		xxxxx		65		ppm/°C

NOTES:
(1) Low output currents, below the continuous conduction threshold will cause an increase in output voltage beyond the load regulation limit. For Application circuit 16935F see the regulation curve on sheet 5.
(2) All VID codes not specifically listed here are invalid and cause shutdown exactly as if the shutdown pin had been asserted. xxxxx refers to any valid VID code.

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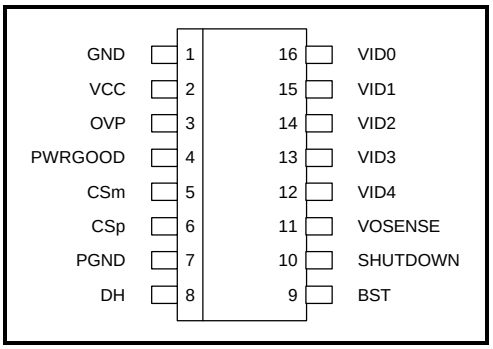
PIN DESCRIPTION

Pin #	Pin Name	Pin Function
1	GND	Small Signal Analog and Digital Ground
2	V_{CC}	Chip Supply Voltage
3	OVP	High Signal out if V_O>setpoint + 20%
4	PWRGOOD(1)	Open collector logic output, high if V_O within 10% of setpoint
5	CSm	Current Sense Input (negative)
6	CSp	Current Sense Input (positive)
7	PGND	Power Ground
8	DH	High Side Driver Output
9	BST	Vcc for High Side Driver
10	SHUTDOWN(1)	Logic low shuts down the converter
11	V_{OSENSE}	Top end of internal feedback chain
12	VID4(1)	Programming Input (MSB)
13	VID3(1)	Programming Input
14	VID2(1)	Programming Input
15	VID1(1)	Programming Input
16	VID0(1)	Programming Input (LSB)



NOTE:
(1) All logic level inputs and outputs are open collector TTL compatible

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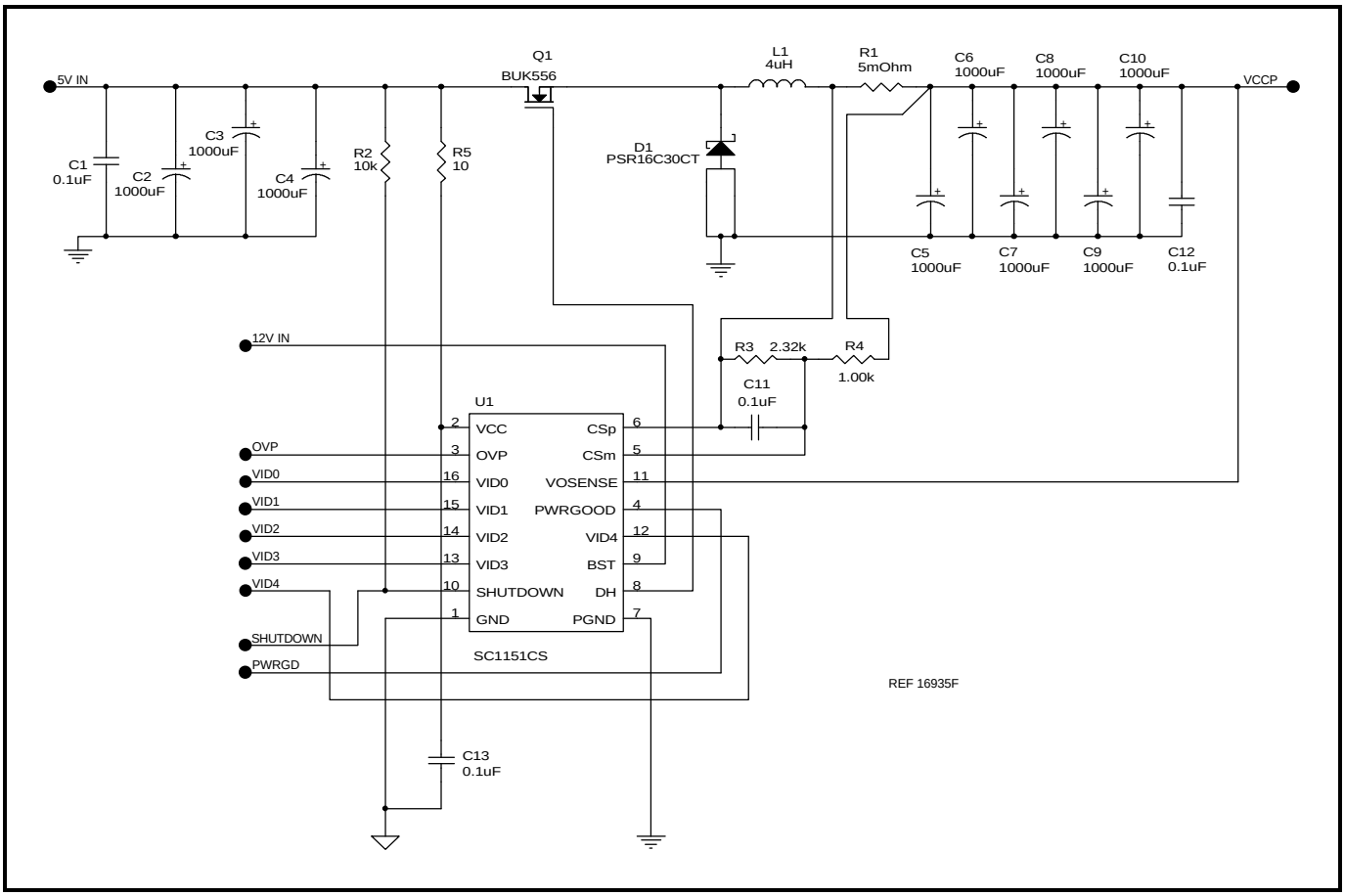
APPLICATION CIRCUIT



MATERIALS LIST

Quantity	Reference	Part/Description	Vendor	Notes
4	C1,C11-C13	0.1µF Ceramic	Various	
9	C2-C10	1000µF/6.3V	SANYO	MV-GX or equiv. Low ESR
1	D1	PSR16C30CT	PHOTRON	
1	L1	4µH		8 Turns 16AWG on MICROMETALS T50-52D core
1	Q1	BUK556	PHILIPS	Logic level FET, ≤22mΩ, 30V
1	R1	5mΩ	IRC	OAR-1 Series
1	R2	10kΩ, 5%, 1/8W	Various	
1	R3	2.32kΩ, 1%, 1/8W	Various	
1	R4	1kΩ, 1%, 1/8W	Various	
1	R5	10Ω, 5%, 1/8W	Various	
1	U1	SC1151CS	SEMTECH	

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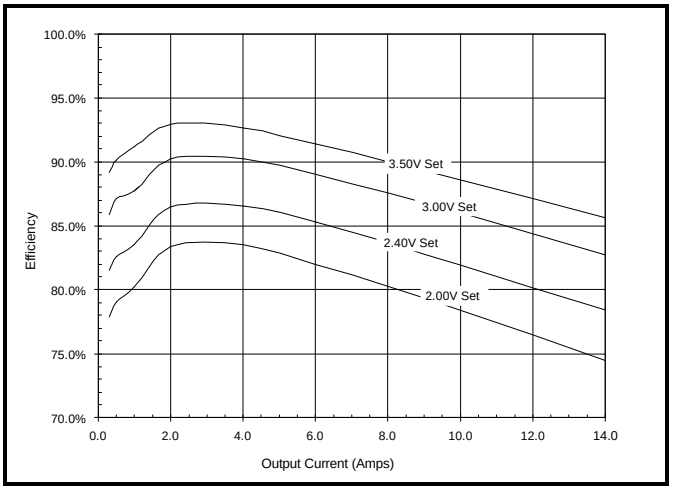
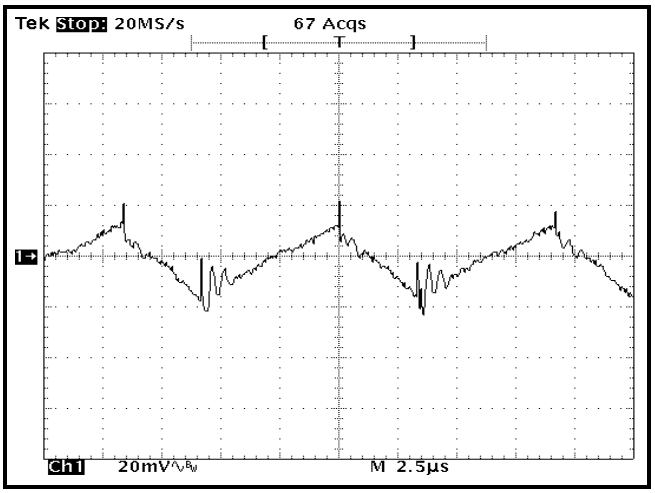
CHARACTERISTIC CURVES

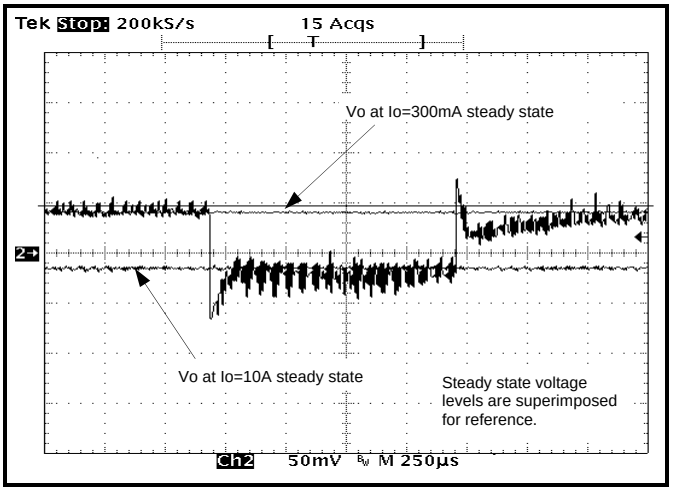
SC1151 Efficiency in Application circuit 16935F



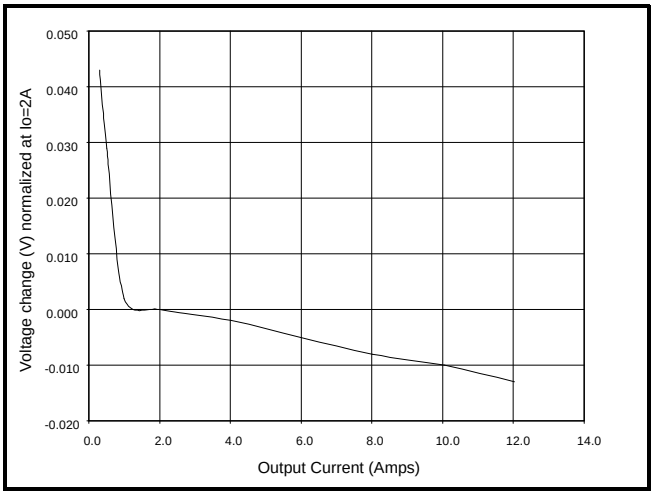
Application circuit 16935F Ripple, 3.1V, 10A out



Application circuit 16935F Transient Response, 3.1V, 0.3A to 10A



SC1151 Regulation in Application circuit 16935F



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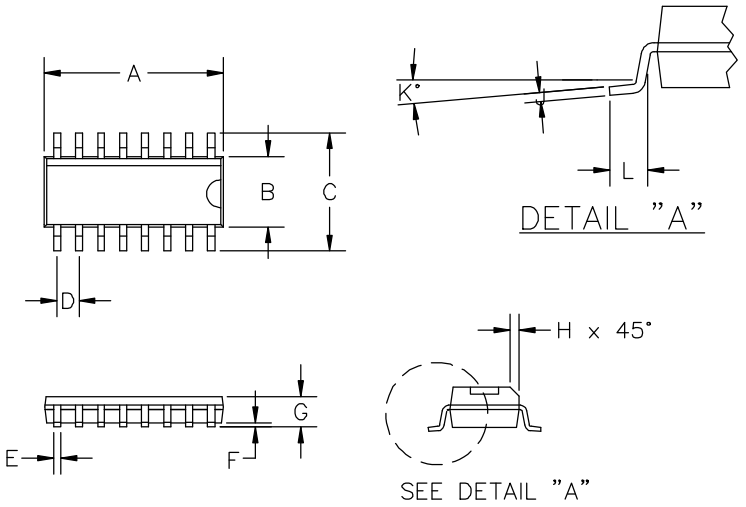
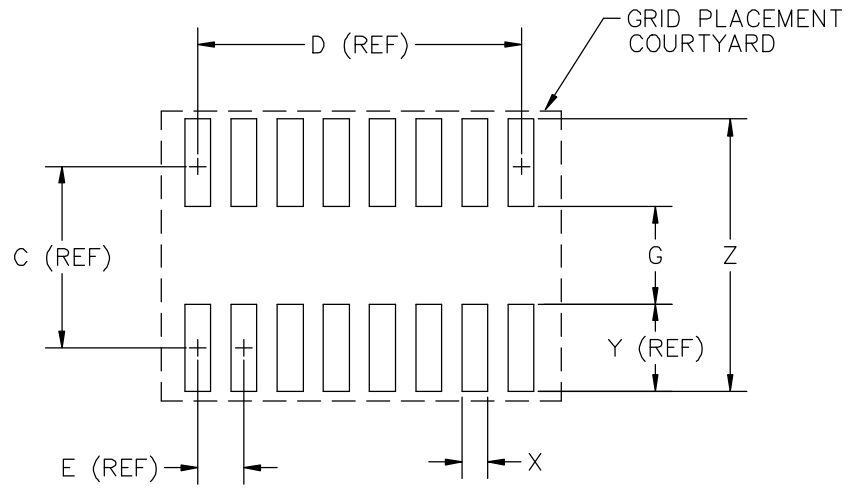
OUTLINE DRAWING SO-16



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.386	.393	9.80	10.0	[2]
B	.150	.158	3.80	4.00	[2]
C	.228	.244	5.80	6.20	–
D	.050 BSC		1.27 BSC		–
E	.013	.020	0.33	0.51	–
F	.004	.010	.10	.25	–
G	.053	.069	1.35	1.75	–
H	.010	.020	.25	.50	–
J	.007	.010	.19	.25	–
K	0°	8°	0°	8°	–
L	.016	.050	.40	1.27	–

[2] DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTUSIONS

LAND PATTERN SO-16



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
C	–	.197	–	5.00	–
D	–	.35	–	8.89	–
E	–	.05	–	1.27	–
G	.102	.110	2.60	2.80	–
X	.02	.03	.60	.80	–
Y	–	.095	–	2.40	–
Z	.28	.29	7.20	7.40	–

[1] GRID PLACEMENT COURTYARD IS 22 X 16 ELEMENTS (11mm X 8mm) IN ACCORDANCE WITH THE INTERNATIONAL GRID DETAILED IN IEC PUBLICATION 97.

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